

Name: ANSWER KEY TP: _____

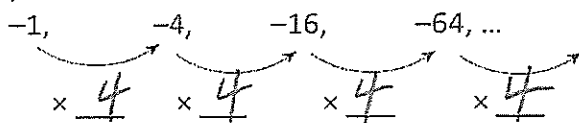
CW#24: Inductive Reasoning, Conjectures & Counterexamples
37 Honors Geometry

CRS	Geometry Content
Objective	5.1 Define and distinguish a conjecture (B2.1) 5.2 Use inductive reasoning to find pattern in sequence (B2.1) 5.3 Use a counterexample to show that a conjecture is false (B2.1)

Conjecture: An unproven statement based on observations






Inductive reasoning: The process of observing data, recognizing patterns and making generalizations about those patterns

Example 1: Describe the pattern in the numbers -1, -4, -16, -64, Write the next three numbers in the pattern. Notice that each number in the pattern is 4 times the previous number.



The next three numbers are -256, -1024, -4096

Example 2: Given five collinear points, make a conjecture about the number of ways to connect the different pairs of points.

Number of points	1	2	3	4	5
Picture					

Number of connections	<u>0</u>	<u>1</u>	<u>3</u>	<u>6</u>	<u>? 10</u>
		<u>+ 1</u>	<u>+ 2</u>	<u>+ 3</u>	<u>+ 4</u>

Conjecture: You can connect five noncollinear points 10 + 4, or 10 different ways.

1) Describe the pattern in the numbers 1, 2.5, 4, 5.5, ... and write the next three numbers in the pattern.

Add 1.5 7, 8.5, 10

2) Rework Example 2 if you are given six noncollinear points.

10 + 5 = 15 connections

15 + 6 = 21 ways

3) Using inductive reasoning to find the next three terms in each sequence.

1, 10, 100, 1000, ...
 $10^0, 10^1, 10^2, 10^3$
 $10^4, 10^5, 10^6$
10,000, 100,000, 1,000,000

4) Using inductive reasoning to find the next two terms in each sequence.

$\frac{1}{6}, \frac{1}{3}, \frac{1}{2}, \frac{2}{3}, \dots$
 $\frac{5}{6}, \frac{1}{6}$ or 1

PUSH IT TO THE LIMIT.

<p>5) Using inductive reasoning to find the next three terms in each sequence.</p> <p>1, 4, 27, 256, ... $5^5, 6^6, 7^7$ $1^2, 2^2, 3^3, 4^4, 5^5, 6^6, 7^7, 8^8, 9^9$</p>	<p>6) Using inductive reasoning to find the next three terms in each sequence.</p> <p>add two terms before (Fibonacci sequence) 1, 1, 2, 3, 5, 8, 13, ... 21, 34, 55 $8+13 \quad 13+21 \quad 21+34$</p>
<p>7) Using inductive reasoning to find the next three terms in each sequence.</p> <p>32, 30, 26, 20, 12, 2 $-10, -24, -40$ $-2 \quad -4 \quad -6 \quad -8 \quad -10 \quad -12$</p>	<p>8) Using inductive reasoning to find the next three terms in each sequence.</p> <p>1, 2, 4, 8, 16, 32 $\times 2, 64, 128, 256$ $\times 2 \times 2$</p>

→ When several examples form a pattern and you assume the pattern will continue, you are applying inductive reasoning. Inductive reasoning is a reasoning that uses a number of specific examples to arrive at a conclusion. This concluding statement you believe to be true reached using inductive reasoning is called a conjecture.

→ To show that a conjecture is true, you must prove it for all cases. However, it only takes one false example to show that a conjecture is not true. This false example is known as a counterexample. A counterexample can be a number, a drawing, or a statement.

STEPS OF INDUCTIVE REASONING:



Determine whether the following statement is true or false. If false the statement is false, find a counterexample to disprove each of the following conjectures.

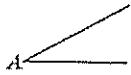
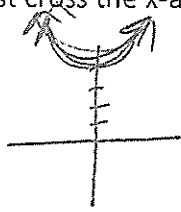
<p>Example 1:</p> <p>CONJECTURE:</p> <p>All four legged pieces of furniture are tables.</p> <p>TRUE or FALSE? <u>FALSE</u></p> <p>COUNTEREXAMPLE: <u>chair</u></p> <p>THEREFORE: <u>Not all 4 legged pieces of furniture are tables</u></p>	<p>Example 2:</p> <p>CONJECTURE:</p> <p>All animals that live in the ocean are fish.</p> <p>TRUE or FALSE? <u>FALSE</u></p> <p>COUNTEREXAMPLE: <u>sharks, whales</u></p> <p>THEREFORE: <u>all animals in the ocean are not fish</u></p>
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PUSH IT TO THE LIMIT.

<p>Example 3:</p> <p>CONJECTURE:</p> <p>All humans need water to survive.</p> <p>TRUE or FALSE?</p> <p>COUNTEREXAMPLE: _____</p> <p>THEREFORE: _____</p>	<p>Example 4:</p> <p>CONJECTURE:</p> <p>All prime numbers are odd.</p> <p>TRUE or FALSE?</p> <p>COUNTEREXAMPLE: <u>2</u></p> <p>THEREFORE: <u>Not all prime #'s are odd</u></p>
<p>Example 5:</p> <p>CONJECTURE:</p> <p>The sum of two odd numbers is always even.</p> <p>TRUE or FALSE?</p> <p>COUNTEREXAMPLE: _____</p> <p>THEREFORE: _____</p>	<p>Example 6:</p> <p>CONJECTURE:</p> <p>If n is a real number, then $n^2 > n$.</p> <p>TRUE or FALSE?</p> <p>COUNTEREXAMPLE: <u>$(\frac{1}{2})^2$ is $\frac{1}{2}$</u></p> <p>THEREFORE: _____</p>
<p>1) Conjecture: If a living being has eyes, it's a human.</p> <p>F - cat</p>	<p>2) Conjecture: The United States of America has 50 states.</p> <p>true</p>
<p>3) Conjecture: All books teach arithmetic.</p> <p>F - Hamlet</p>	<p>4) Conjecture: The difference of two positive numbers is always a positive number.</p> <p>true</p>
<p>5) Conjecture: If the product of 2 numbers is positive, then the two numbers must both be positive.</p> <p>False $(-2)(-3) = 6$</p>	<p>6) Conjecture: A line must always contain two or more points.</p> <p>true</p>
<p>7) Conjecture: If a parabola is a stretch, it cannot be reflected over the x-axis.</p> <p>False $-2x^2 + 3x - 4$</p>	<p>8) Conjecture: The vertex is the lowest point of a parabola.</p> <p>False - max</p>

9) Conjecture: If it is a green plant then it is a tree. <i>bush / shrub</i>	10) Conjecture: If the vertex is the <u>highest</u> point on a given parabola then the parabola has been reflected. <i>true</i>
11) Conjecture: All triangles have an interior angle that is equal to 90° . <i>False 60, 60, 60</i>	12) Conjecture: If it has a heart then it is a living thing. <i>true</i>
13) Conjecture: If you know the coordinates of two points on a line then you can find its slope. <i>true</i>	14) Conjecture: All celebrities live in Hollywood California. <i>False</i>
15) Conjecture: If the <u>radicand</u> is negative then in its simplest form it will contain an i . <i>true</i>	16) Conjecture: All <u>carbonated</u> drinks are a type of <u>soda</u> . <i>true</i>

Explain why the following counter examples are not valid.

17) Conjecture: All angles are acute. Counterexample:  Angle A is an example of an angle that is not acute; therefore not all angles are acute. <i>∠A is acute. A counterex is obtuse</i>	18) Conjecture: All parabolas must cross the x-axis and the y-axis. Counterexample: $y = x^2 + 4$  $y = x^2 + 4$ is an example of a parabola that crosses both axes; therefore not all parabolas must cross the x-axis and the y-axis. <i>This crosses the</i>
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19) Why is only one counterexample necessary to show a conjecture is false?

It only takes one counterexample to disprove something

20) Which do you think is easier to do: prove a conjecture or find a counterexample? Why?

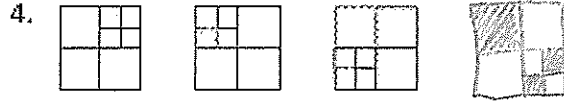
it is easier to find one counterexample for a conjecture than to find a pattern for many cases

PUSH IT TO THE LIMIT.

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Failure to show work on all problems or use complete sentences will result in a LaSalle.

Sketch the next figure in the pattern.



For numbers 5-8 write the next two numbers in the sequence.

5. 113, 224, 335, 446, ... 557, 668

\downarrow
+111

6. 4, 6, 9, 13, 18, ... 24, 31

\downarrow
 $+2, +3, +4, +5, +6$

7. $\frac{1}{3}, \frac{3}{4}, \frac{5}{5}, \frac{7}{6}, \dots$ $\frac{9}{7}, \frac{11}{8}$

8. $\frac{7}{8}, \frac{6}{7}, \frac{5}{6}, \frac{4}{5}, \dots$ $\frac{3}{4}, \frac{2}{3}$

9. 3, 0, -3, -6, ... -9, -12

\downarrow
-3

10. 1, 4, 9, 16, ... 25, 36

\downarrow
 $1^2, 2^2, 3^2, 4^2$ $5^2 =$

Some of the following conjectures are true and some can be proven false using a counterexample. If the statement is true, write the word TRUE in the box. For statements that are false, provide a counterexample.

11) Conjecture: Everything that's hot is fried chicken.

False - pizza

12) Conjecture: English is the only language spoken in the United States.

False - spanish

13) Conjecture: The square of an odd integer is odd.

$3^2 = 9$ *true*

14) Conjecture: If n is a real number then $-n$ is a negative number.

$n = -2$ $-n = -(-2) = 2$
False

15) Conjecture: The monthly high temperature in Abilene is never below 90°F two months in a row.

The Monthly High Temperatures for Abilene, Texas

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
88	89	95	97	99	101	103	107	101	97	91	89

False → Jan & Feb

16) Conjecture: The graph of a quadratic function $y = ax^2 + bx + c$ ($a \neq 0$) is always a parabola.

True

17) Conjecture: A quadratic equation always has two solutions.

False $y = x^2$ has one solution

18) Conjecture: Every quadratic function is factorable.

False
 $x^2 + 7x + 11$

19) Conjecture: The vertex of a parabola will always lie on the y-axis.

False $y = x^2 + 3x + 7$

20) Simplify:

$$(x^4 + 8x^3) - (2 - 4x^3) - (5 + 5x^4)$$

$$\cancel{x^4} + 8x^3 - 2 + 4x^3 - 5 - \cancel{5x^4}$$

$$-4x^4 + 12x^3 - 7$$

21) Simplify:

$$(4n^2 - 3 + n) - (7 + 3n^2 - 4n)$$

$$4n^2 - 3 + n - 7 - 3n^2 + 4n$$

$$n^2 + 5n - 10$$

22) Your classmate says that 0.0000000432 represented in scientific notation is 4.32×10^8 . Is your classmate right or wrong? Explain and show work.

It should be
 4.32×10^{-8}

23) Convert the following into scientific notation:

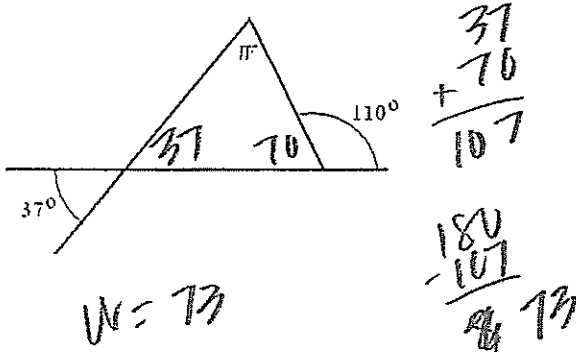
a. 12,000 1.2×10^4

b. 0.000563 5.63×10^{-4}

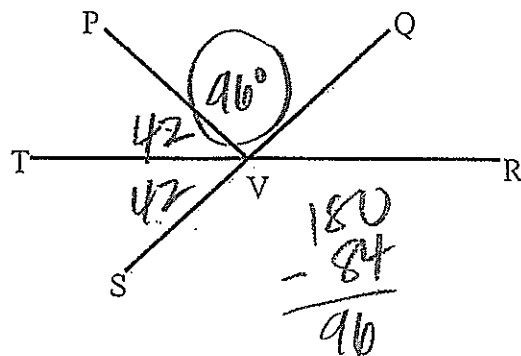
c. 557,000,000 5.57×10^8

d. 64 6.4×10^1

24) Find the measure of angle W.



25) If angle PVT is 42° and angle PVT is congruent to angle SVT, find angle PVQ.



me: ANSWER KEY

TP: _____

CW# 35: Conditional Statements
Honors Geometry

CRS	Geometry Content
Objective	5.4 Identify and write a conditional statement 5.5 Write an inverse, converse, and contrapositive of a conditional statement.

What is a conditional statement?

A conditional statement is a logical statement that contains a hypothesis and a conclusion.

The if contains the **hypothesis** of the statement

The then contains the **conclusion** of the statement



A conditional statement can be **TRUE** or **FALSE**

To write a conditional statement, identify the sentence's hypothesis and conclusion by figuring out which part of the statement depends on the other. The hypothesis is the information that you can assume to be true. The conclusion is the effect of the hypothesis.

Identify the hypothesis and conclusion.

1) If it is raining, then there are clouds in the sky. HYPOTHESIS: <u>if it is raining</u> CONCLUSION: <u>then there are clouds in the sky</u>	
2) All birds have feathers. \rightarrow <u>if an animal is a bird, then it has feathers</u> HYPOTHESIS: <u>if an animal is a bird</u> CONCLUSION: <u>then it has feathers</u>	
3) If you do your homework, then you can go to the movies afterwards. H: <u>if you do your hw</u> C: <u>then you can go to movies afterwards</u>	5) All poets are writers. <u>if a person is a poet, then they are a writer</u> H- <u>if a person is a poet</u> C- <u>then they are a writer</u>
4) Two angles are supplementary if they are a linear pair. <u>if two angles are a linear pair, then they are supplementary</u>	6) Two points are on the same line if they are collinear. <u>if two points are collinear, then they are on the same line</u>

The negation of a statement is the opposite of the original statement.

7) Statement: The ball is red. Negation: <u>The ball is not red</u>	8) Statement: The car is <u>not</u> dirty. Negation: <u>The car is dirty</u>
9) Statement: The food in the cafeteria is delicious. Negation: <u>The food in the caf. is not delicious</u>	10) Statement: There is not enough homework in this class. Negation: <u>There is enough hw in this class</u>

PUSH IT TO THE LIMIT.

Conditional statement is a logical statement that contains a hypothesis (IF) and a conclusion (THEN).

- FLIP! To write the converse of a conditional statement, exchange the hypothesis and the conclusion.
- NEGATE! To write the inverse of a conditional statement, negate both the hypothesis and the conclusion.
- FLIP & NEGATE! To write the contrapositive of a conditional statement, first write the converse and then negate both the hypothesis and the conclusion.

Write the converse, inverse, and contrapositive for each conditional statement that is given. Then decide whether each statement is *true* or *false*.

		True/False
1) Conditional Statement	If $m\angle A = 99^\circ$, then $\angle A$ is obtuse.	T
Converse flip	If $m\angle A$ is obtuse, then $m\angle A = 99^\circ$	F
Inverse negate	If $m\angle A \neq 99^\circ$, then $m\angle A$ is not obtuse (ex- 120°)	F
Contrapositive flip & negate	If $m\angle A$ is not obtuse, then $m\angle A$ is not 99°	T

		True/False
2) Conditional Statement	If two lines intersect to form a right angle, then they are perpendicular.	T
Converse flip	If two lines are perpendicular, then they intersect to form a right angle	T
Inverse	If two lines do not intersect to form a right angle, then the two angles are not \perp	T
Contrapositive	If two lines are not \perp , then they do not intersect to form a right \angle	T

		True/False
3) Conditional Statement	If the sum of the interior angles of a polygon is 360° , then it is a rectangle. (square)	F
Converse	If a polygon is a rectangle, then the sum of the interior angles is 360°	T
Inverse	If the sum of the interior angles of a poly are not 360° , then it is not a rectangle	T
Contrapositive	If a polygon is not a rectangle, then the sum of the interior angles is not 360°	F

Look back to the 3 previous examples. What do you notice about the pattern of true and false statements?

conditional & contrapositive are same

converse & inverse are same

A conditional statement and its contrapositive are either both true or both false. Similarly, the converse and the inverse of a conditional statement are either both true or both false.

Create one non-math and one math conditional statement. Then, write the converse, inverse, and contrapositive for each conditional statement. Then decide whether each statement is true or false.

If it weren't for my bad luck, then I'd have no luck at all.

If you can't feed a hundred people - then just feed one. *M. Theresa*

If you dream it, then you can achieve it.

All pop (soda) has caffeine.

		True/False
4) Conditional Statement	If a drink is pop, then it has caffeine. <i>sprite</i>	F
Converse	If a drink has caffeine, then it is pop. <i>coffee</i>	F
Inverse	If a drink is not pop, it does not have caffeine	F
Contrapositive	If a drink does not have caffeine, then it is not pop	F

When $x = 6$, $x^2 = 36$.

		True/False
5) Conditional Statement	If $x=6$, then $x^2=36$	T
Converse	If $x^2=36$, then $x=6$	F
Inverse	If $x \neq 6$, then $x^2 \neq 36$ <i>-6</i>	F
Contrapositive	If $x^2 \neq 36$, then $x \neq 6$	T

. angle with a measure between 90° and 180° is called obtuse.

True/False

6) Conditional Statement	If an angle measures between 90 and 180, then it is called obtuse	T
Converse	If an angle is obtuse, then it measures between 90 and 180.	T
Inverse	If an angle is not between 90 and 180, then it is not obtuse	T
Contrapositive	If an angle is not obtuse, then its measure is not between 90 and 180	T

7) Use the venn diagram below to evaluate whether the follow statements are true (T) or false (F).

Musicians

a. IF-THEN: If you are in chorus, then you are a musician.

b. CONVERSE: If you are a musician, then you are in chorus.

c. INVERSE: If you are not in chorus, then you are not a musician.

d. CONTRAPOSITIVE: If you are not a musician, then you are not in chorus.

a. T or F ☒ T ☐ F

b. T or F ☐ T ☒ F

c. T or F ☐ T ☒ F

d. T or F ☐ T ☒ F

8) Write some possible conditional statements in if-then form, converse, inverse, and contrapositive statements for the diagram below. Evaluate whether the statements are true or false

Quadrilaterals

a. IF-THEN: If a quad is a rectangle, then it is a square

b. CONVERSE: If a quad is a square, then it is a rect

c. INVERSE: If a quad is not a rectangle, then it is not a square

d. CONTRAPOSITIVE: If a quad is not a square, then it is not a rectangle

a. T or F ☐ T ☒ F


b. T or F ☐ T ☒ F

c. T or F ☐ T ☒ F

d. T or F ☐ T ☒ F

7.) If two angles are complementary, then they add to 90°

9.) If $x=2$, then $3x+10=16$

11.) False 

13.) False 100° 120°

15.) False, 2

17.) False - no indication of right angle

19.) X

21.) X

Name: ANSWER KEY TP: _____

Failure to write in complete sentences and show all work will result in LaSalle!

Rewrite the conditional statements in if-then form.

<p>1) The measure of a straight angle is 180°. HYPOTHESIS: <u>If an angle measures 180°</u> CONCLUSION: <u>then it is a straight angle</u> IF-THEN FORM: <u>If an angle measures 180°, then it is a straight angle</u></p>	<p>2) Congruent segments are segments that are equal in measure. HYPOTHESIS: <u>If two segments are equal in measure,</u> CONCLUSION: <u>then they are congruent</u> IF-THEN FORM: <u>If two segments are congruent, then they are equal in measure.</u></p>
<p>3) Today is Monday if yesterday was Sunday. HYPOTHESIS: <u>If yesterday was Sunday</u> CONCLUSION: <u>then today is Monday</u> IF-THEN FORM: <u>If yesterday was Sunday, then today is Monday</u></p>	<p>4) A number is divisible by 4 if it is divisible by 8. HYPOTHESIS: <u>If a number is \div by 8,</u> CONCLUSION: <u>then it is \div by 4</u> IF-THEN FORM: <u>If a # is \div by 8, then it is \div by 4.</u></p>

Write the converse, inverse, and contrapositive for each conditional statement that is given. Then decide whether each statement is *true* or *false*.

		True/False
6) Conditional Statement	If the weather is warm, then we will go swimming.	T
Converse	<u>If we go swimming, then the weather is warm.</u>	T
Inverse	<u>If the weather is not warm, then we will not go swimming.</u>	T
Contrapositive	<u>If we do not go swimming, then the weather is not warm</u>	T

		True/False
7) Conditional Statement	If $x^2 = 25$, then $x = 5$	F
Converse	<u>If $x = 5$, then $x^2 = 25$</u>	T
Inverse	<u>If $x^2 \neq 25$, then $x \neq 5$</u>	T
Contrapositive	<u>If $x \neq 5$, then $x^2 \neq 25$</u> <u>$x = -5$</u>	F

PUSH IT TO THE LIMIT.

		True/False
8) Conditional Statement	If $x = -6$, then $ x = 6$	T
Converse	If $ x = 6$, then $x = -6$	F
Inverse	If $x \neq -6$, then $ x \neq 6$	F
Contrapositive	If $ x \neq 6$, then $x \neq -6$	T

		True/False
9) Conditional Statement	If points D, E, and F are collinear, then $DE + EF = DF$	F
Converse	If $DE + EF = DF$, then points D, E and F are collinear	F
Inverse	If points D, E and F are not collinear, then $DE + EF \neq DF$	F
Contrapositive	If $DE + EF \neq DF$, then points D, E and F are not collinear.	F

Write 2-3 conditional statements in if-then form and determine whether your statements are true or false. Then write a converse, inverse, and contrapositive statements for each of your examples.

10)

a. IF-THEN: If an animal is a pet, then it is a dog. a. T or F

b. CONVERSE: If an animal is a dog, then it is a pet. b. T or F

c. INVERSE: If an animal is not a pet, it is not a dog. c. T or F

d. CONTRAPOSITIVE: If an animal is not a dog, it is not a pet. d. T or F

11) Simplify:

$$(1 + 7n + 5n^4) - (2 - 4n - n^4)$$

$$1 + 7n + 5n^4 - 2 + 4n + n^4$$

$$6n^4 + 11n - 1$$

12) Write the following in scientific notation:

a. 0.007
 7×10^{-3}

b. 730000
 7.3×10^5

Name: answer key TP: _____

CW#35 Deductive Reasoning
Honors Geometry

CRS	Geometry Content
Objective	5.6 Define and apply deductive reasoning

The difference between inductive and deductive reasoning:

Inductive:	Deductive:
<p>→ uses several examples to make a conjecture</p> <p>→ will <u>not</u> always be true</p>	<p>→ uses facts, rules and is applied to specific situations</p>

Examples:

<p>For the past three weeks, Ms. Ziegler checked homework on Tuesdays and Thursdays.</p> <p>What can you induce? <i>Ms. Z will ✓ h/w on Tues & Thurs (based on pattern)</i></p>	<p>In the syllabus, Ms. Ziegler stated that she would check homework every Tuesday and Thursday. Today is Thursday.</p> <p>What can you deduce? <i>Ms. Z will ✓ h/w Tues/Thurs (based on fact that it is in syllabus)</i></p>
<p>While doing her homework, Taniya noticed the following pattern:</p> <p><i>use examples & find pattern</i></p> $\begin{aligned} \sqrt{2} \cdot \sqrt{2} &= \sqrt{4} = 2 \\ \sqrt{3} \cdot \sqrt{3} &= \sqrt{9} = 3 \\ \sqrt{4} \cdot \sqrt{4} &= \sqrt{16} = 4 \end{aligned}$ <p>So, she decides that if you are multiplying by the same radicand, you can simply rewrite the radicand without the radical:</p> <p><i>conjecture (which happens to be true)</i></p> $\sqrt{x} \cdot \sqrt{x} = x$	<p>Today in class, Ms. Ziegler stated the following rule:</p> <p><i>rule / known fact</i></p> $\sqrt{x} \cdot \sqrt{x} = x$ <p>Therefore, Elena knows that if $x = 7$, then the following will apply:</p> $\sqrt{7} \cdot \sqrt{7} = 7$

English Example

every quiz has been easy. therefore, the next quiz will be easy

English Example

you must take a placement exam for math classes if you are a freshman. you are a freshman → you will take exam.

Math Example

0, 1, 3, 6, 10, 15, 21, 28

+0 +1 +2 +3 +4 +5

use several examples to find pattern (probably true)

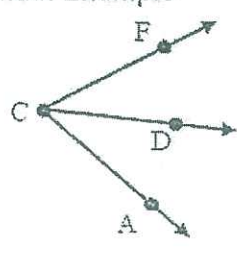
Math Example

CD bisects ∠FCA

therefore

∠FCD ≅ ∠DCA

Fact is true



PUSH IT TO THE LIMIT.

Read the following statements:

a) I scored below 60% on the past 3 tests. The next test I take will also be below a 60%.

b) If I score below a 60% on a test, then I earned an F. I earned an F on my last test therefore, I scored below 60%.

Are both statements always true? Explain your thinking in at least 2 sentences.

(a) is NOT true & is inductive

(b) is true & is deductive

Part 2: Identify

Below is a bunch of situations. Circle all situations that use deductive reasoning.

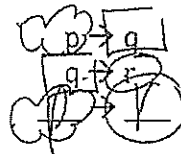
AB and FG do not intersect. Therefore $AB \parallel FG$.		If you are 48 inches tall, you can ride the new ride at Great America. You rode the new ride so you are taller than 48 inches.
A regular Hexagon has a side length of 3 inches. The sum of all side lengths is 18 inches.	Students go to school Monday thru Friday. Today is Monday, so all students are in school.	1, 5, 9, 13...

Law of Syllogism

If the hypothesis p, then conclusion q.

If hypothesis q, then conclusion r.

If hypothesis p, then conclusion r.



EX. 4: If it snows today, then I will wear my gloves. If I wear my gloves, my fingers will get itchy.

→ If it snows today, my fingers will get itchy.

Directions: If possible, use the Law of Syllogism to write a new conditional statement that follows from the pair of true statements.

Example 3:

If Rick takes chemistry this year, then Jesse will be Rick's lab partner.

If Jesse is Rick's lab partner, then Rick will get an A in chemistry.

If Rick takes chem this year, then Rick will get an A in chem.

Example 4:

If $x^2 > 25$, then $x^2 > 20$.

If $x > 5$, then $x^2 > 25$.

If $x > 5$, then $x^2 > 20$.

*Watch the order

Example 5:

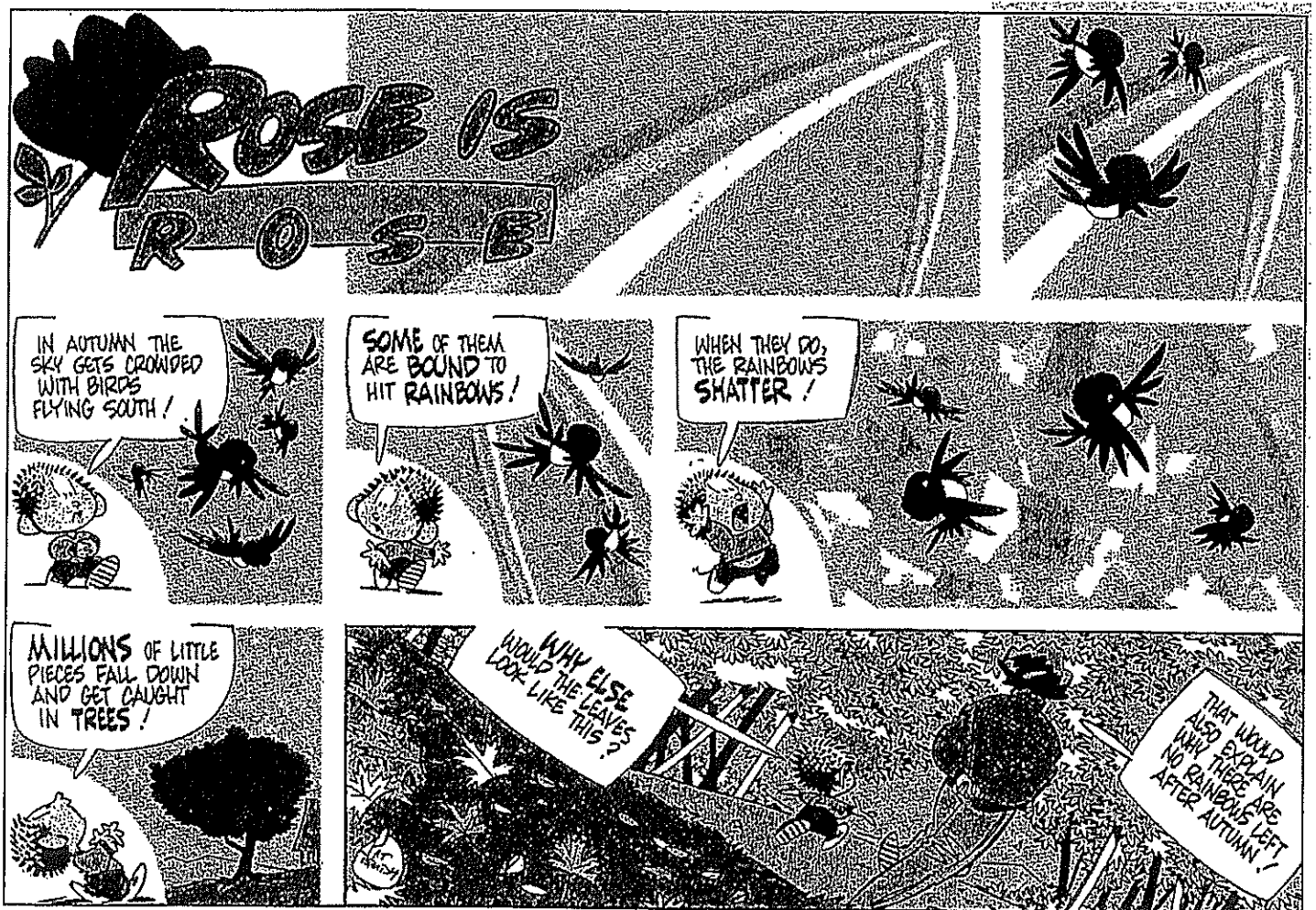
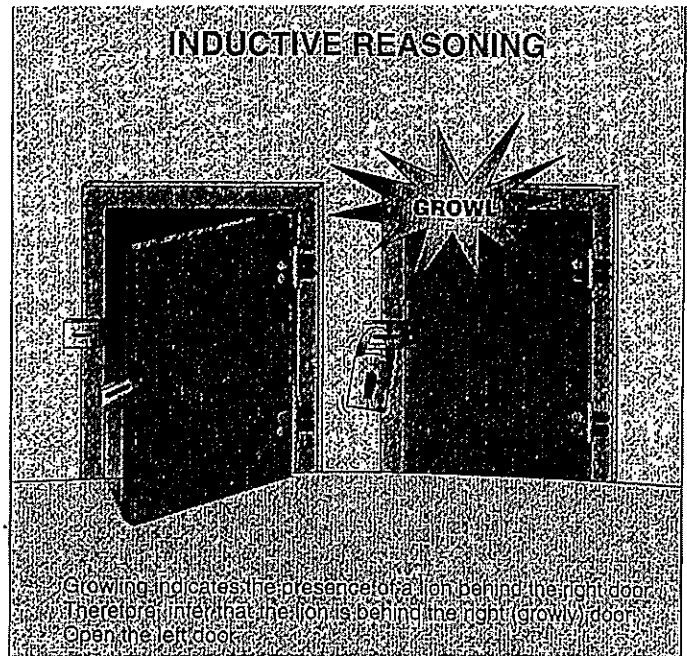
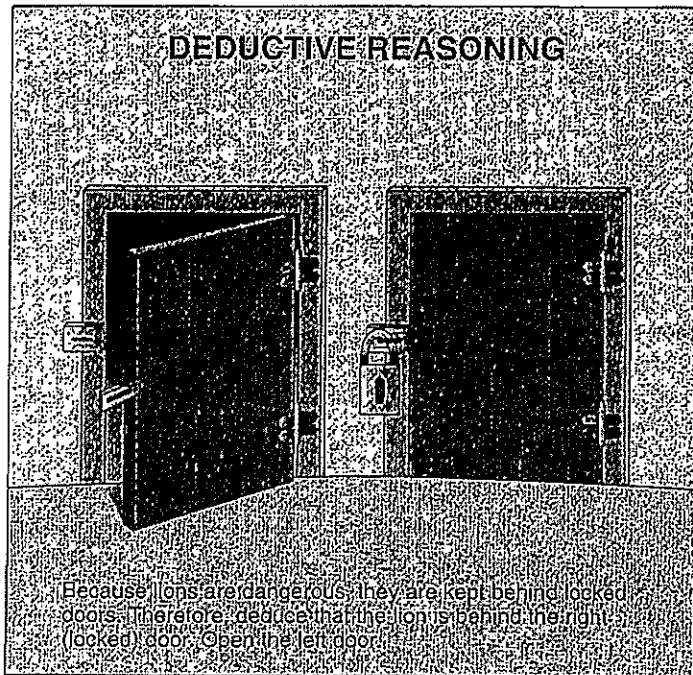
If a polygon is regular, then all angles in the interior of a polygon are congruent.

If a polygon is regular, then all of its sides are congruent.

cannot use law of syllogism

PUSH IT TO THE LIMIT.

Project for students to see (NOT in student packet)



Name: _____ TP: _____

HW#34: Deductive Reasoning

Honors Geometry

Due Date: Thursday, Nov 8th, 2012

Jan 24th

Failure to write in complete sentences and show all work will result in LaSalle!

What conjecture can you make from each problem below? Sketch a picture to help confirm your conjecture. Then state if you used inductive or deductive reasoning.

1. $\angle 3$ and $\angle 4$ are a linear pair.

$\frac{4}{3}$ therefore, they are supplementary
deductive

2. $DE = EF$

E is the midpoint of DF?
D E F
D E F
E is the midpoint of DF?
inductive
DE is \neq to EF deductive

Determine whether the following statements use inductive or deductive reasoning and state why.

3. All Snickers bars have nuts. I am allergic to nuts. Therefore I should not eat a Snickers bar.

deductive - two stated truths and specific outcome

4. I went to Lake Tahoe four times and every time it snowed. When I go next, it will be snowing.

inductive b/c this is based on pattern of previous examples

5. An advertisement says "If you like to snowboard, then you'll love North Star at Tahoe." Shiraz likes to snowboard, but when he went to North Star he didn't like it very much. If you know that Shiraz saw the ad, explain how his reasoning was flawed.

The ad used inductive reasoning which may or may not be true

- *6. Explain why inductive reasoning is not the best method to prove something is true in geometry.

Because your conjecture may not be true

Determine whether the students used Inductive Reasoning or Deductive Reasoning to arrive at the conclusion. Explain your reasoning.

- 7) Nicole knows that all students in Ms. Yarrington's 5th period have English homework tonight. Her friend Michael is in Ms. Yarrington's 5th period. Therefore, Michael has English homework tonight.

deductive - stated fact

- 8) Isabel read one of the Twilight series books and it bored her. She concludes that all of the Twilight books are boring.

inductive - assuming all will be boring based on personal experience

- 9) Grant notices that the Footlocker by his house and the Footlocker by his school are having sales. He concludes that all Footlockers are having a sale currently.

inductive - assuming all foot lockers will be on sale

- 10) Sandra is convinced that all cartoons are for kids. She just heard from her friends about a new cartoon called "Phineas and Ferb" and she tells her friends, "That show is childish."

inductive

PUSH IT TO THE LIMIT.

Use the Law of Syllogism to write a statement (C) that would follow if statements (A) and (B) were true.

11) (A) If you eat too much turkey, then you get sick.
(B) If you get sick, then you will not be able to go to school.

(C) If you eat too much turkey, then you will not be able to go to school.

12) (A) If an angle measure is more than 90° , then it is not acute.

(B) If an angle is not acute, then it is obtuse.

(C) If an angle measure is more than 90° , then it is obtuse.

13) (A) Jim is taller than Christian.

(B) Christian is taller than Yvette.

(C) Jim is taller than Yvette.

14) (A) If you pay attention, you will do well on your homework.

(B) If you pay attention, you will do well on your quiz.

(C) cannot use law of syllogism

15) The expression $2c^2$ and $4c + 16$ are equivalent when c is equal to what values? (Solve for c)

$$\begin{aligned} 2c^2 &= 4c + 16 \\ 2c^2 - 4c - 16 &= 0 \\ 2(c^2 - 2c - 8) &= 0 \\ (c - 4)(c + 2) &= 0 \\ c &= 4, -2 \end{aligned}$$

16) In standard coordinate plane, a line m passes through the points $(2, -5)$ and $(-3, 7)$. What is the slope of line m ?

$$\frac{7 + 5}{-3 - 2} = \frac{12}{-5}$$

17) Smith Flooring company sells vinyl peel and stick floor tiles are 1 foot square. What is the minimum number of these tiles needed to tile the entire floor of 14 foot by 16 foot rectangular room and the adjoining bathroom of 10 foot by 16 foot?

384 tiles

18) Simplify $2\sqrt{192}$

$$\begin{aligned} 2\sqrt{64 \cdot 3} \\ 8\sqrt{3} \\ 16\sqrt{3} \end{aligned}$$

19) Simplify $(4i + 5)(-3i - 2)$

$$\begin{aligned} -12i - 8i - 15i - 10 \\ 2 - 22i \end{aligned}$$

20) Simplify $\sqrt[3]{\frac{18}{64}}$

$$\frac{\sqrt[3]{18}}{4}$$

21) In standard (x, y) coordinate plane, point M with coordinate $(-4, 7)$ is the midpoint of CD , and C has coordinate $(3, 8)$. What is the coordinate of D ?

$$\begin{aligned} \frac{3 + x}{2} &= -4 & \frac{8 + y}{2} &= 7 \\ 3 + x &= -8 & 8 + y &= 14 \\ x &= -11 & y &= 6 \end{aligned}$$

22) Given the b is positive real number, solve for b :

$$c = b^2 - 16d$$

$$\begin{aligned} c + 16d &= b^2 \\ \sqrt{c + 16d} &= b \end{aligned}$$

Name: _____ TP: _____

HW#35H: Algebraic
Honors Geometry

Due Date: Friday, Nov. 9th, 2012

PUSH IT TO THE LIMIT.

Use the Law of Syllogism to write a statement (C) that would follow if statements (A) and (B) were true.

11) (A) If you eat too much turkey, then you get sick.
(B) If you get sick, then you will not be able to go to school.

(C)

12) (A) If an angle measure is more than 90° , then it is not acute.

(B) If an angle is not acute, then it is obtuse.

(C)

13) (A) Jim is taller than Christian.

(B) Christian is taller than Yvette.

(C)

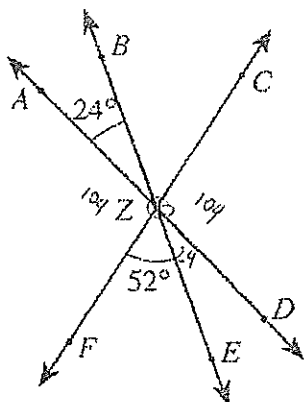
14) (A) If you pay attention, you will do well on your homework.

(B) If you pay attention, you will do well on your quiz.

(C)

15)

In the figure below, \overleftrightarrow{AD} , \overleftrightarrow{BE} , and \overleftrightarrow{CF} all intersect at point Z, with angle measures as marked. What is the measure of $\angle CZE$?



- F. 76°
- G. 104°
- H. 114°
- J. 118°
- K. 128°

16)

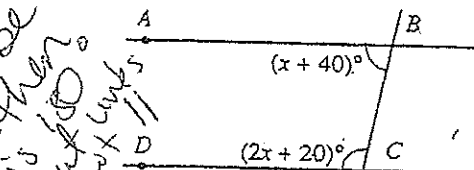
In the figure below, transversal r crosses both p and q , and a° and b° are measures of the indicated angles, both between 0° and 180° . Lines p and q will cross somewhere to the left of transversal r (that is, on the side opposite the indicated angles). Which of the following statements best expresses a true relationship between a and b for all possible positions of transversal r ?

- F. $a < b$
- G. $a = b$
- H. $a + b < 180$
- J. $a + b = 180$
- K. $a + b > 180$

because lines intersect to the left of r then angles will be more obtuse, hence greater than 180°

18)

In the figure below, the measure of $\angle ABC$ is $(x + 40)^\circ$ and the measure of $\angle BCD$ is $(2x + 20)^\circ$. What are all the values of x such that the measures of $\angle ABC$ and $\angle BCD$ must be between 0° and 180° and \overleftrightarrow{AB} is NOT parallel to \overleftrightarrow{CD} ?

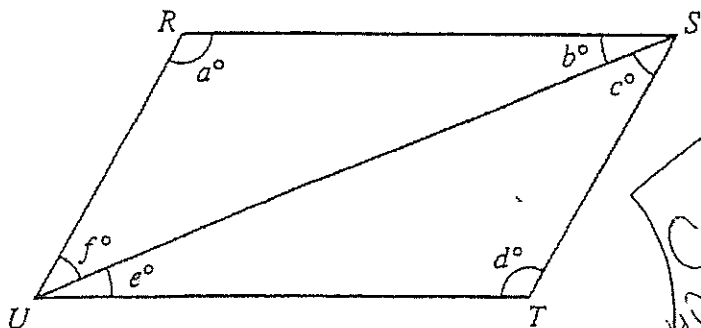


- F. $x \neq 40$
- G. $-40 < x < 140$
- H. $-10 < x < 80$
- J. $-40 < x < 40$ or $40 < x < 140$
- K. $-10 < x < 40$ or $40 < x < 80$

Can't be 40, because sum is 180 but lines w/ x //

17)

Which of the following conditions would force \overleftrightarrow{RS} and \overleftrightarrow{UT} , shown below, to be parallel?



- F. $b^\circ = f^\circ$
- G. $b^\circ = e^\circ$
- H. $c^\circ = f^\circ$
- J. $a^\circ + c^\circ = 180^\circ$
- K. $a^\circ + f^\circ = 180^\circ$

PUSH IT TO THE LIMIT.